



(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention  
of the grant of the patent:  
**22.03.2006 Bulletin 2006/12**

(51) Int Cl.:  
**A23L 1/318** <sup>(2006.01)</sup> **A23B 4/32** <sup>(2006.01)</sup>  
**A47J 9/00** <sup>(2006.01)</sup> **A47J 43/16** <sup>(2006.01)</sup>

(21) Application number: **02090222.7**

(22) Date of filing: **25.06.2002**

(54) **Device for injection of solid material into foods**

Vorrichtung zur Einspritzung eines festen Guts in Nahrungsmittel

Dispositif d'injection de matière solide dans des aliments

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE TR**

(30) Priority: **26.06.2001 US 891915**

(43) Date of publication of application:  
**02.01.2003 Bulletin 2003/01**

(60) Divisional application:  
**05090330.1 / 1 632 139**

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**US-A- 4 703 688**

• **PATENT ABSTRACTS OF JAPAN vol.012, no. 491**  
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**202345 A (RHEON AUTOM MACH CO LTD), 22**  
**August 1988 (1988-08-22)**

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## Description

### FIELD OF THE INVENTION

**[0001]** The present inventions are directed primarily toward food preparation devices and particularly toward devices which inject substances into foods.

### BACKGROUND OF THE INVENTION

**[0002]** It is common today for cooks in homes, bakeries and restaurants to use hypodermic type needles to inject marinades, flavorings and other liquid substances into meats and other food products. Such devices are also commonly used to inject more viscous liquids and semi liquids such as jellies, frostings, puddings, into such foods as cakes, cream puffs, eclairs and cupcakes. Typically these devices resemble oversized medical hypodermic syringes which the cook fills through the back of the barrel and hand operates by pushing a plunger. These devices allow flavorings to penetrate inside and throughout the food and provide foods with a moistness, texture, and/or taste they might otherwise lack.

**[0003]** Commercial food injection devices have also been in common use for many years. Like their home and restaurant counterparts, these devices typically use hollow needles inserted into the food to inject liquids and semi liquid substances. Their applications include not only injecting flavorings and food substances such as already mentioned, but also liquid and semi liquid substances to increase food weight, decrease spoilage, and help in processing. Three such commercial food injection devices are shown in U.S. Patents 4,455,928, Townsend - Means for Injecting Fluids Into Food Products; 5,275,095, Van Haren - Brine Injection Device; 5,881,640, Raevsager - Apparatus for Injecting Brine Into Food Products.

**[0004]** A further food injection device is known from US-A-4 703 688. The device described therein comprises a tube filled with the liquid to be injected and a piston to close the rear end of the tube. After injection, the filled tube is withdrawn while holding the piston nondisplaceable.

**[0005]** Document JP 63 202345 A discloses an apparatus to pack a soft ingredient of fibrous structure into another material. The apparatus includes an injection needle and a cylinder pushing the material to be injected through the needle, the cylinder being driven by a motor.

**[0006]** Document US-A-3 241 477 describes an injecting device for the injection of materials such as garlic into meat comprising an injection tube, a pushing cylinder and a dispensing receptacle. The material to be injected is held by the dispensing receptacle and pieces of the material are cut off by the cylinder before being injected.

**[0007]** It is an object of the invention to provide for a versatile device and method which permits to inject a variety of substances such as dried spices, salt, sugar, sunflower seeds, peanuts, garlic cloves, chunks of pine-

apple, jellybeans, chunky peanut butter, etc. into foods. As examples, whole peanuts could be injected into sesame rolls, or pineapple chunks injected into hams, or garlic cloves injected into a pot roast, or jellybeans injected into frosted cupcakes, or lemon chunks injected into rotisserie cooked chicken, or walnuts injected into roast beef, or ice cream injected into angel food cake, etc., using the same device.

### SUMMARY OF THE INVENTION

**[0008]** The invention provides a device to inject solid objects such as peanuts, walnuts, pineapple and lemon chunks, garlic cloves and other solid objects into a food article. The device comprises a first plunger and a second plunger which is pushed by the first plunger; a first hollow sleeve containing the second plunger, wherein the first sleeve is configured to receive solid objects and to have the solid objects pushed through the sleeve by the second plunger while the second plunger is being pushed by the first plunger. The device further comprises a penetrating tip disposed on a first end of the first sleeve and configured to both pierce the food article and to pass solid objects from the sleeve through the tip and into the pierced food article.

**[0009]** The invention further provides a method of injecting solid objects such as peanuts, walnuts, pineapple and lemon chunks, garlic cloves and other solid objects into food articles using a hollow sleeve with a food piercing tip having a moving member to retain solid objects within the sleeve on its front end, a first and a second plunger. The method comprises the steps of loading solid objects through the rear end of the hollow sleeve and the solid objects being restrained from exiting the sleeve by the moving member, behind the solid objects, placing the second plunger into the hollow sleeve, piercing a food article with the food piercing tip, moving the second plunger through the sleeve causing the solid objects to push against and deflect the moving member and causing the solid objects to be ejected from the sleeve through the food piercing tip and into the pierced food article and using the first plunger to push and move the second plunger through the hollow sleeve.

**[0010]** Preferred embodiments are identified in the dependent claims.

### BRIEF DESCRIPTION OF THE DRAWINGS

#### [0011]

FIG. 1 is an exploded perspective view of an embodiment incorporating the present invention.

FIG. 2 is an end view of needle 21 taken from penetrating point 24 end of needle 21.

FIG. 3 is a perspective side view of needle 21.

FIG. 4 is an end view of needle 23 taken from penetrating point 26 end of needle 23.

FIG. 5 is a perspective side view of needle 23.

FIG. 6 is a cross-section view of FIG. 1.

FIG. 7 is the cross-section view of FIG. 1 after solids 66 have been injected.

FIG. 8 is a perspective view of an example for a power drive mechanism comprising direct manual pressure on a plunger.

FIG. 9 shows an example of a motor drive

#### DETAILED DESCRIPTION OF THE DRAWINGS

**[0012]** Several embodiments of the present inventions are illustrated in the appended figures. In brief, all embodiments comprise four interrelated sections: the injection needle, the solid material mover, the power drive, and the material loading mechanism.

**[0013]** Starting with the injection needle, embodiments as illustrated in FIGS. 1 through 7, show two alternative constructions 20 and 22, both having needles 21 and 23, ending in penetrating points 24 and 26, and both having movable port covers, shown respectively as 28 and 30, to cover respectively injected solid exits 32 and 34. Penetrating points 24 and 26 allow piercing into the object to be injected. Movable port covers 28 and 30 may serve either and/or both the purpose or purposes of structurally supporting penetrating points 24 and 26, and/or restraining materials to be injected from leaving the needle until the materials are driven out by the solid material mover.

**[0014]** In the embodiments as illustrated in FIGS. 1 through 7, the solid material mover comprises plunger 36 which slides into and out of needle 21 or needle 23 and thus pushes solids out respectively through food injected solid exits 32 or 34 covered by respectively movable port cover 28 and 30.

**[0015]** In turn, plunger 36 is pushed into needle 21 or 23 by the power drive mechanism comprising pusher plunger 38 which slides inside of barrel 40 driven by manual pressure.

**[0016]** FIG. 8 shows another example for a power drive mechanism comprising direct manual pressure on plunger 38. This eliminates the need for pusher plunger 38, barrel 40 and needle ring securing nut 54.

**[0017]** Other configurations for the power drive mechanism might also be employed. As examples, a solenoid drive such as used in electric staple guns, or a powered screw drive mechanism such as used in electric cookie presses, or a ratcheted screw drive mechanism such as used in electric caulking guns, or a flexible shaft drive such as used in orthopedic surgical equipment might also be used to replace the mechanism previously described.

**[0018]** One example of a motor drive is illustrated in FIG. 9. As already described, this embodiment uses a gear reduced electric motor to drive a plunger which pushes material to be injected out of the injection needle and into the object to be injected.

**[0019]** In the embodiments shown in FIGS. 1 through 7, the material loading mechanism comprises placing solids to be injected into needle 21 through opening 42 or into needle 23 through opening 44. Openings 42 and 44

are opposite respectively penetrating points 24 and 26 on their respective needles 21 and 23. In the example shown in FIG. 1 needle 21 or 23 must first be removed from barrel 40 by unscrewing needle ring securing nut 54 before materials may be loaded through openings 42 or 44. Alternatively, pusher plunger 38 and plunger 36 may be backed out of barrel 40 and materials to be injected may be dropped into the back of barrel 40 where they may drop by gravity into needle 21 or needle 23. Plunger 36 and pusher plunger 38 would then be reinserted into barrel 40.

**[0020]** Alternatively, the material loading mechanism may comprise splitting 46 needle 21 or splitting 48 needle 23 and hinging a portion of each needle so that the unhinged portion could dip into and scoop up solids and semi solids to be injected. This dipping and scooping is similar to a spoon scooping up material. After dipping, scooping and filling the needle, the hinged portion of the needle would be swung back into place and secured, as an example, by sliding ring 50 or 52 respectively over needle 21 or 23, and plunger 36 driven by the power drive mechanism would push the solids or semi solids out respectively through injected solid exits 32 or 34. Ring 50 or 52 could be held in place on their respective needles 21 and 23 by friction or by a small protrusion sliding over an indented groove to make a snap fit. Such snap fits are well known in the art and thus are not described in detail herein.

**[0021]** To make operation easier of the material loading mechanism just described, hinge 72 might be biased so hinged needle portion 60 naturally springs outward as shown in FIG. 3 when ring 50 is removed from needle 21. This would mean needle 21 would be naturally open for scooping when ring 50 was removed. Alternatively, or in conjunction with the above, finger lever 74 attached to hinged needle portion 60 might help with finger pressure to move hinged needle portion 60 to its open position as shown in dotted lines in FIG. 3.

**[0022]** Operating the embodiment comprises the steps of filling needle 21 or 23 with solids 66 using one of the material loading mechanisms such as just described or an equivalent. Once the embodiment is loaded and any needed reassembly completed, the needle is pierced into the object to be injected, and the power drive mechanism is activated, as an example by manual pressure as described above on intermediate thumb pads 60 and/or on primary thumb pad 58. This causes solids 66 to be expelled from the embodiment as shown in FIG. 7.

**[0023]** The embodiment may be constructed at any scale including: small-scales, appropriate for use in orthopedic surgery or other medical procedures such as implanting solid medicines or objects; intermediate scales such as illustrated in the appended figures for use in food preparation; to larger scales appropriate for inserting solid objects underground or other places.

**[0024]** Likewise, many different materials may be appropriate for use in constructing embodiments of the present inventions. As examples, the embodiment

shown may have needles 21 and 23 constructed from pliable plastics such as polypropylene, nylon, polyethylene or polycarbonate. Barrel 40, pusher plunger 38, and needle ring securing might as examples be made from ABS, polycarbonate, polypropylene, acrylic diecast aluminum etc. Medical embodiments of the present inventions might use similar materials or might be constructed from other materials such as stainless steel.

**[0025]** Other features might easily be added to the preferred embodiment such as volumetric measuring markings on the side of needles 21 and 23 or barrel 40. Clear or translucent materials on needles 21 and 23 and barrel 40 might help or be necessary in the use of such markings.

**[0026]** The embodiment may also be used for injecting all viscosity of liquids, including: light viscosity liquids, semi liquids, highly viscous liquids, and liquids containing solids. To accomplish these tolerances between plunger 36 and the inside of the needle 21 or 23 might be adjusted so lighter liquids would be driven out. Also, movable port covers 28 or 30 might have to fit tightly when closed to keep lighter viscosity liquids from escaping before injection.

**[0027]** For all embodiments described herein, many features detailed need not be necessary to practice the present inventions. Likewise, most features described herein can obviously be interchanged between embodiments even where they are not specifically shown.

**[0028]** The invention will now be discussed in even more detail with respect to the figures.

**[0029]** As shown in FIG. 1, the present invention utilizes barrel 40, pusher plunger 38 (with modifications described below), and needle securing nut 54 similar to a typical home liquid food injecting syringe. Typical liquid injecting needle 56 is shown to illustrate how it might be interchanged with solid injecting needles 21 and 23. Primary thumb pad 58 and intermediate thumb pads 60 are also shown. As illustrated by the dotted line thumb in Fig. 6, intermediate pads 60 help people with smaller hands press on pusher plunger 38 when it is extended.

**[0030]** As shown in FIG. 2, four movable port covers 28 are shown in solid line in their closed positions, and in dotted line 29 in their open positions. Also shown in dotted line 60 is hinged needle portion in its open position and in solid line 59 in its closed position.

**[0031]** Needle 21 is indicated as being cylindrical tube 25 terminated on one end by penetrating point 24. Round cross-section cylindrical tube 25 is volumetrically efficient, easy to clean, and offers easy to fit orientation to cylindrical plunger 36 which fits within tube 25.

**[0032]** Other cross-sections than round might also be used however. As examples, elliptical, eye shape, square, egg shape, star shape, etc. cross-sections might also be employed. Depending on the item to be injected, these alternative cross-sections may work and may even provide additional benefits. As an example, an eye shape cross-section may help to close the needle hole after injection.

**[0033]** Penetrating point 24 is shown as the tip of a cone formed from closed movable port covers 28.

**[0034]** Four movable port covers 28 are also indicated in FIG. 2 and FIG. 3. Fewer or more divisions for the port covers could also be used. As examples, 2, 3, 5, 6, 7, etc. regularly or irregularly spaced port covers might replace the four regularly spaced covers shown. All that is necessary is that the port covers restrain materials within needle 21 from falling out before injection and that penetrating point 24 be strong enough to pierce the article to be injected.

**[0035]** Cylindrical plunger 36 laterally slides into and out of needle 21. This may be either a high tolerance or low tolerance fit depending on the coarseness of contents to be injected.

**[0036]** As seen in FIG. 3, movable port covers 28 and the hinged needle portion in its open position 60, as well as ring 50 are all shown in dotted lines. FIG. 2 and FIG. 3 shown how movable port covers 28 deflect to allow solid contents from needle 21 to exit. FIGs. 2 and 3 also show how the hinged needle portion swings out 60 to allow loading of needle 21 by scooping into the contents to be loaded like a spoon or by loading by other means such as hand inserting contents to be injected 66 into open needle 21.

**[0037]** Hinge 72 is indicated as being as molded living hinged such as might be used if needle 21 were molded from polypropylene or other suitable material. Hinged 72 is shown as being biased toward the hinged needle portion being in its open position as indicated by dotted line 60. This bias assists in filling needle 21 by having the needle be naturally open and able to scoop or be filled by hand or other means until needle 21 is closed and ring 50 is fitted onto it.

**[0038]** Referring to FIG. 4, shown in dotted line 64 is the hinged needle portion on its open position. Needle 23 is indicated as being cylindrical tube 27 terminated on one end by penetrating point 24 formed by an angled cut across the end of cylindrical tube 27. Like needle 21, cross-sections other than round might be advantageously employed.

**[0039]** As seen in FIG. 5, movable port cover 30 in its open position 31, and hinged needle portion 64, as well as ring 52 are shown in dotted lines. FIG. 4 and FIG. 5 show in dotted line 31 how movable port cover 30 deflects to allow solid contents from needle 23 to exit. FIGs. 4 and 5 also show how hinged needle portion 64 swings out to allow loading of needle 23 by scooping into the contents to be loaded or by loading by other means such as hand inserting solid contents into open needle 23.

**[0040]** FIG. 1 shows the assembled embodiment of FIG. 1 readily injecting solids 66. Hand 68 indicates one example of how the embodiment might be used. Dotted line thumb 70 shows an example of how a person with a smaller hand might operate the embodiment by pressing on disk shaped intermediate thumb pads 60. Intermediate thumb pads 60 are circular ribs disposed orthogonal to the axis of pusher plunger 38. These intermediate pads

allow pusher plunger 38 to be pressed down, using one or two hands, without having to reach primary thumb pad 58 on the end of the pusher plunger 38.

**[0041]** FIG. 8 is a perspective view of an example for a power drive mechanism comprising direct manual pressure on a plunger which eliminates the need for pusher plunger 38, barrel 40 and needle ring securing nut 54. Also shown are markings 76 for measuring the amount of material to be injected. To utilize these markings, ring 78 and needle 80 would advantageously be made from clear or translucent material. This example also incorporates intermediate thumb pads 82 to make it easier for people with small hands to use the embodiment similar to intermediate thumb pads 60 on embodiments described herein. Intermediate thumb pads 82 may provide support for two thumbs simultaneously or one thumb to press on plunger 84. Likewise, primary thumb pad 86 may allow one or two hand operation.

**[0042]** FIG. 9 shows a motorized example of the present inventions. Needle 88 does not have certain features of the embodiments of the invention including splitting 46 needle 88 and having related finger lever 74. For all embodiments described herein, many features detailed need not be necessary to practice the present inventions. Likewise, most features described herein can obviously be interchanged between embodiments even where they are not specifically shown. As an example, needle 88 in FIG. 9 could be split 46 and could also have finger lever 74.

**[0043]** The example shown in FIG. 9 has outer case 90 housing gear reduced motor driven ratchet gear 92 which drives in one direction 94 plunger 96 when plunger 96 is inserted into tubular track 98 and grooves 100 on plunger 96 engage ratchet gear 92, and when also the user presses button switch 102 which activates rotation of ratchet gear 92. Grooves 100 are held in engagement against ratchet gear 92 by pressure on the side of plunger 96 toward ratchet gear 92 from leaf spring 104. Spring 104 assisted ratcheting engagement also allows plunger 96 to be inserted through tubular track 98 in direction 94 with manual pressure without activating rotation of ratchet gear 92.

**[0044]** Needle 88 can be inserted and removed from outer case 90 by sliding needle 88 into and out of slots 106. This may be desirable for cleaning, or use of other needles, or for other purposes.

**[0045]** The example may be operated in a variety of ways. As an example, needle 88 could first be filled with materials to be injected. This could be done in several ways. As an example, before attachment to outer case 90, needle 88 might be filled through its rear and needle 88 then attached to outer case 90. As another example, materials to be injected could be dropped into hopper 108 and gravity fed into needle 88 etc.

**[0046]** Plunger 96 could then be inserted 94 into tubular track 98 and pressed until it blocked the rear entry of needle 88. The user could then pierce the item to be injected with needle 88 and press button switch 102 caus-

ing plunger 96 to drive the materials to be injected out of needle 88 and into the item to be injected.

**[0047]** Needle 88 would then be removed from the item to be injected and plunger 96 removed from outer case 90 and needle 88 by plunger 96 being pulled in direction 94 through the tip of needle 88.

## Claims

1. A device to inject solid objects such as peanuts, walnuts, pineapple and lemon chunks, garlic cloves and other solid objects into a food article, the device comprising:

a first plunger (38);  
a second plunger (36) which is pushed by the first plunger (38);  
a first hollow sleeve (25, 27) containing the second plunger;  
the first sleeve (25, 27) configured to receive solid objects and to have the solid objects (66) pushed through the sleeve (25, 27) by the second plunger (36) while the second plunger (36) is being pushed by the first plunger (38); and  
a penetrating tip (24, 26) disposed on a first end of the first sleeve (25, 27) and configured to both pierce the food article and to pass solid objects (66) from the sleeve (25, 27) through the tip (24, 26) and into the pierced food article.

2. The device of claim 1 wherein the first plunger (38) is configured to be pushed by hand against the second plunger (36) to pass the solid objects (66) into the pierced food article.

3. The device of claim 1 further comprising the tip (24, 26) having a moving member (28) configured to retain solid objects within the first sleeve (25, 27).

4. The device of claim 1 further comprising a second hollow sleeve (40) containing the first plunger (38) and the second hollow sleeve (40) being attached to the first hollow sleeve (25, 27).

5. The device of claim 4 further comprising the first hollow sleeve (25, 27) together with the second plunger (36) contained within the first hollow sleeve (25, 27) being interchangeable with a liquid conveying tubular needle (56).

6. The device of claim 1 further comprising the solid objects (66) being received into the first hollow sleeve (25, 27) through a second end of the first hollow sleeve (25, 27) and the second end being opposite to the first end.

7. The device of claim 1 wherein the penetrating tip (24,

- 26) has a moving member (28) with a first position to restrain solid objects (66) in the first sleeve (25, 27) from exiting the sleeve (25, 27), the moving member (28) having a second position which allows solid objects (66) to pass through the tip (24, 26), and the tip (24, 26) is configured to pierce food articles. 5
8. The device of claim 1 wherein the second plunger (36) is configured to fit into the first hollow sleeve (25, 27) through its rear end. 10
9. The device of claim 1 further comprising a motor powering the first plunger (38). 15
10. A method of injecting solid objects such as peanuts, walnuts, pineapple and lemon chunks, garlic cloves and other solid objects (66) into food articles using a hollow sleeve (25, 27) with a food piercing tip (24, 26) having a moving member (28) to retain solid objects (66) within the sleeve (25, 27) on its front end and a first and a second plunger, the method comprising the steps of: 20
- loading solid objects (66) through the rear end of the hollow sleeve (25, 27) and the solid objects (66) being restrained from exiting the sleeve (25, 27) by the moving member (28); 25
- behind the solid objects (66), placing the second plunger (36) into the hollow sleeve (25, 27);
- piercing a food article with the food piercing tip (24, 26); 30
- moving the second plunger (36) through the sleeve (25, 27) causing the solid objects (66) to push against and deflect the moving member (28) and causing the solid objects (66) to be ejected from the sleeve (25, 27) through the food piercing tip (24, 26) and into the pierced food article; and 35
- using the first plunger (38) to push and move the second plunger (36) through the hollow sleeve (25, 27). 40
11. The method of claim 10 further comprising using hand power to move the second plunger (36) through the hollow sleeve (25, 27). 45

#### Patentansprüche

1. Vorrichtung zur Einspritzung fester Objekte, wie zum Beispiel Erdnüsse, Walnüsse, Ananas und Zitronenstückchen, Knoblauchzehen und anderer fester Objekte, in ein Nahrungsmittel, wobei die Vorrichtung Folgendes umfasst: 50
- einen ersten Schieber (38);
- einen zweiten Schieber (36), der von dem ersten Schieber (38) geschoben wird; 55
- eine erste hohle Hülse (25, 27), die den zweiten Schieber enthält;
- wobei die erste Hülse (25, 27) zur Aufnahme fester Objekte und zum Hindurchschieben der festen Objekte (66) durch die Hülse (25, 27) von dem zweiten Schieber (26), während der zweite Schieber (36) von dem ersten Schieber (38) geschoben wird, konfiguriert ist; und
- eine Eindringspitze (24, 26), die an einem ersten Ende der ersten Hülse (25, 27) angeordnet ist und dazu konfiguriert ist, das Nahrungsmittel zu durchstechen und feste Objekte (66) von der Hülse (25, 27) durch die Spitze (24, 26) und in das durchstochene Nahrungsmittel zu führen.
2. Vorrichtung nach Anspruch 1, bei der der erste Schieber (38) dazu konfiguriert ist, von Hand gegen den zweiten Schieber (36) zu drücken, um die festen Objekte (66) in das durchstochene Nahrungsmittel zu führen.
3. Vorrichtung nach Anspruch 1, bei der weiterhin die Spitze (24, 26) ein bewegliches Glied (28) aufweist, das zum Halten von festen Objekten in der ersten Hülse (25, 27) konfiguriert ist.
4. Vorrichtung nach Anspruch 1, bei der weiterhin eine zweite hohle Hülse (40) den ersten Schieber (38) enthält und die zweite hohle Hülse an der ersten hohlen Hülse (25, 27) befestigt ist.
5. Vorrichtung nach Anspruch 4, bei der weiterhin die erste hohle Hülse (25, 27) zusammen mit dem in der ersten hohlen Hülse (25, 27) enthaltenden zweiten Schieber (36) gegen eine röhrenförmige Flüssigkeitsbeförderungsnadel (56) austauschbar ist.
6. Vorrichtung nach Anspruch 1, bei der weiterhin die festen Objekte (66) durch ein zweites Ende der ersten hohlen Hülse (25, 27) in der ersten hohlen Hülse (25, 27) aufgenommen werden und sich das zweite Ende gegenüber dem ersten Ende befindet.
7. Vorrichtung nach Anspruch 1, bei der die Eindringspitze (24, 26) ein bewegliches Glied (28) mit einer ersten Position, in der feste Objekte (66) in der ersten Hülse (25, 27) daran gehindert werden, die Hülse (25, 27) zu verlassen, und einer zweiten Position, in der feste Objekte (66) durch die Spitze (24, 26) passieren können, aufweist, wobei die Spitze (24, 26) zum Durchstechen von Nahrungsmitteln konfiguriert ist.
8. Vorrichtung nach Anspruch 1, bei der der zweite Schieber (36) dazu konfiguriert ist, in die erste hohle Hülse (25, 27) durch deren hinteres Ende zu passen.
9. Vorrichtung nach Anspruch 1, weiterhin mit einem

motorangetriebenen ersten Schieber (38).

10. Verfahren zur Einspritzung fester Objekte, wie zum Beispiel Erdnüsse, Walnüsse, Ananas und Zitronenstückchen, Knoblauchzehen und anderer fester Objekte, in Nahrungsmittel unter Verwendung einer hohlen Hülse (25, 27) mit einer Nahrungsmitteldurchstechungsspitze (24, 26), die ein bewegliches Glied (28) zum Festhalten von festen Objekten (66) in der Hülse (25, 27) an ihrem Vorderende und einen ersten und einen zweiten Schieber aufweist, wobei das Verfahren die folgenden Schritte umfasst:

Laden fester Objekte (66) durch das hintere Ende der hohlen Hülse (25, 27), wobei die festen Objekte (66) von dem beweglichen Glied (28) daran gehindert werden, die Hülse (25, 27) zu verlassen;

hinter den festen Objekten (66) Anordnen des zweiten Schiebers (36) in der hohlen Hülse (25, 27);

Durchstechen eines Nahrungsmittels mit der Nahrungsmitteldurchstechungsspitze (24, 26);  
Bewegen des zweiten Schiebers (36) durch die Hülse (25, 27), wodurch bewirkt wird, dass die festen Objekte (66) gegen das bewegliche Glied (28) drücken und es durchbiegen und die festen Objekte (66) durch die Nahrungsmitteldurchstechungsspitze (24, 26) aus der Hülse (25, 27) in das durchstochene Nahrungsmittel ausgestoßen werden;

Verwenden des ersten Schiebers (38) zum Schieben und Bewegen des zweiten Schiebers (36) durch die hohle Hülse (25, 27).

11. Verfahren nach Anspruch 19, bei dem weiterhin der zweite Schieber (36) mit Handkraft durch die hohle Hülse (25, 27) bewegt wird.

## Revendications

1. Dispositif pour injecter des objets solides comme des morceaux de cacahuète, de noix, d'ananas et de citron, des gousses d'ail et d'autres objets solides dans un article alimentaire, le dispositif comprenant :

un premier piston (38) ;  
un deuxième piston (36) qui est poussé par le premier piston (38) ;  
un premier manchon creux (25, 27) contenant le deuxième piston ;  
le premier manchon (25, 27) étant configuré pour recevoir des objets solides et pour que les objets solides (66) soient poussés au travers du manchon (25, 27) par le deuxième piston (36) tandis que le deuxième piston (36) est poussé par le premier piston (38) ; et

une pointe pénétrante (24, 26) disposée sur une première extrémité du premier manchon (25, 27) et configurée tant pour percer l'article alimentaire que faire passer les objets solides (66) à partir du manchon (25, 27) au travers de la pointe (24, 26) et dans l'article alimentaire percé.

2. Dispositif selon la revendication 1, dans lequel le premier piston (38) est configuré pour être poussé à la main contre le deuxième piston (36) pour faire passer les objets solides (66) dans l'article alimentaire percé.

3. Dispositif selon la revendication 1, comprenant, en outre, la pointe (24, 26) qui présente un élément mobile (28) configuré pour retenir les objets solides à l'intérieur du premier manchon (25, 27).

4. Dispositif selon la revendication 1, comprenant, en outre, un deuxième manchon creux (40) contenant le premier piston (38) et le deuxième manchon creux (40) étant attaché au premier manchon creux (25, 27).

5. Dispositif selon la revendication 4, comprenant, en outre, le premier manchon creux (25, 27) conjointement avec le deuxième piston (36) contenu à l'intérieur du premier manchon creux (25, 27) qui est interchangeable avec une aiguille tubulaire acheminant du liquide (56).

6. Dispositif selon la revendication 1, comprenant, en outre, les objets solides (66) qui sont reçus dans le premier manchon creux (25, 27) au travers d'une deuxième extrémité du premier manchon creux (25, 27), et la deuxième extrémité étant opposée à la première extrémité.

7. Dispositif selon la revendication 1, dans lequel la pointe pénétrante (24, 26) présente un élément mobile (28) avec une première position pour empêcher les objets solides (66) dans le premier manchon (25, 27) de quitter le manchon (25, 27), l'élément mobile (28) ayant une deuxième position qui permet aux objets solides (66) de passer au travers de la pointe (24, 26), et la pointe (24, 26) est configurée pour percer les articles alimentaires.

8. Dispositif selon la revendications 1, dans lequel le deuxième piston (36) est configuré pour s'adapter dans le premier manchon creux (25, 27) au travers de son extrémité arrière. le premier manchon creux (25, 27) au travers de son extrémité arrière.

9. Dispositif selon la revendication 1, comprenant, en outre, un moteur alimentant en énergie le premier piston (38).

10. Procédé pour injecter des objets solides comme des morceaux de cacahuète, de noix, d'ananas et de citron, des gousses d'ail et d'autres objets solides (66) dans des articles alimentaires en utilisant un manchon creux (25, 27) avec une pointe (24, 26) perçant les aliments qui ont un élément mobile (28) pour retenir les objets solides (66) à l'intérieur du manchon (25, 27) sur son extrémité avant et un premier piston et un deuxième piston, le procédé comprenant les étapes de :

charger lesdits objets solides (66) au travers de l'extrémité arrière du manchon creux (25, 27), les objets solides (66) étant empêchés de quitter le manchon (25, 27) par l'élément mobile (28) ;  
placer, derrière les objets solides (66), le deuxième piston (36) dans le manchon creux (25, 27) ;  
percer un article alimentaire avec la pointe (24, 26) de perçage des aliments ;  
déplacer le deuxième piston (36) au travers du manchon (25, 27) en provoquant que les objets solides (66) poussent contre l'élément mobile (28) et dévient celui-ci, et en provoquant que les objets solides (66) soient éjectés du manchon (25, 27) au travers de la pointe (24, 26) perçant les aliments et dans l'article alimentaire percé ;  
et  
utiliser le premier piston (38) pour pousser et déplacer le deuxième piston (36) au travers du manchon creux (25, 27).

11. Procédé selon la revendication 10, comprenant, en outre, l'utilisation de l'énergie manuelle pour déplacer le deuxième piston (36) au travers du manchon creux (25, 27).

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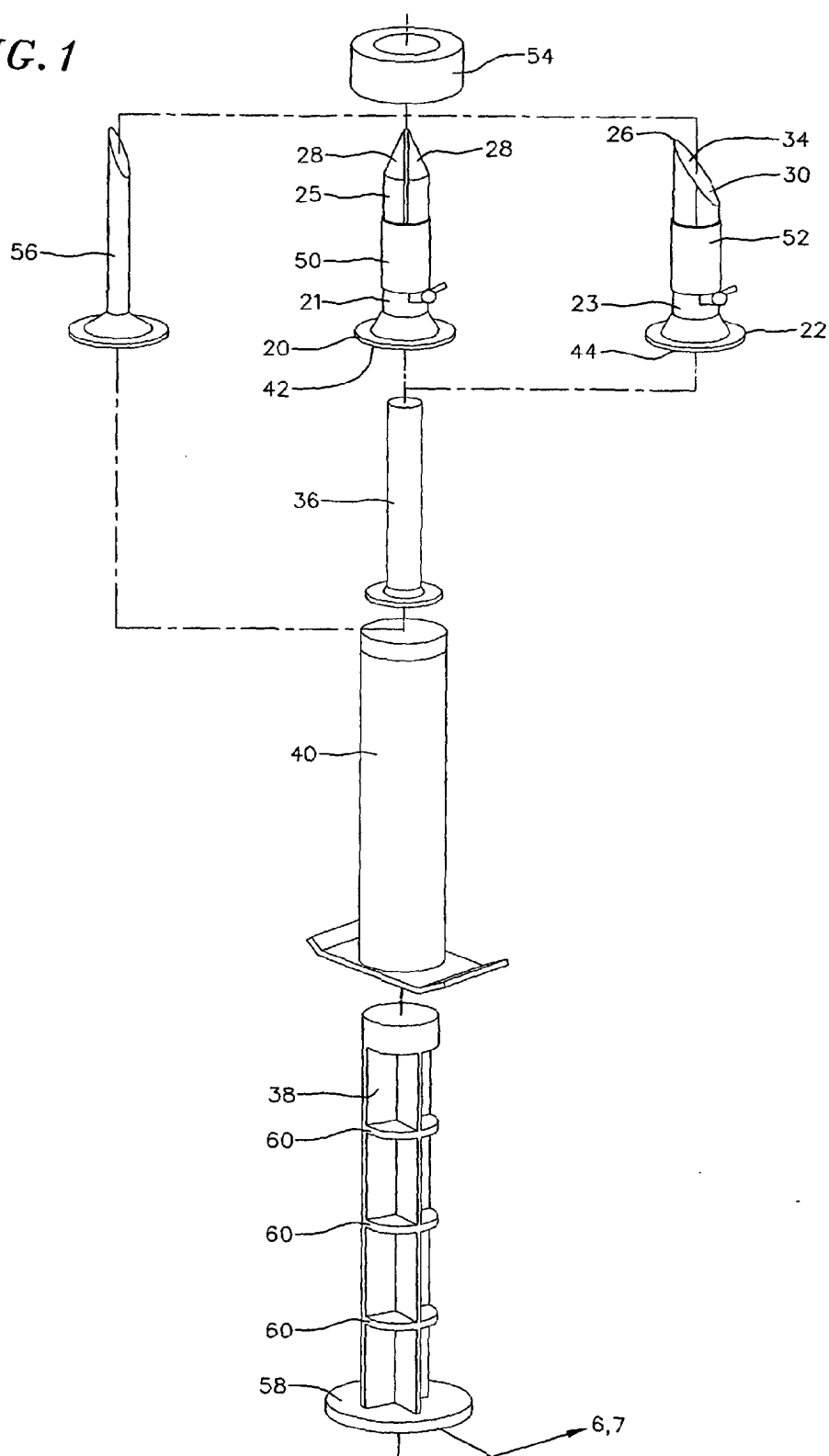
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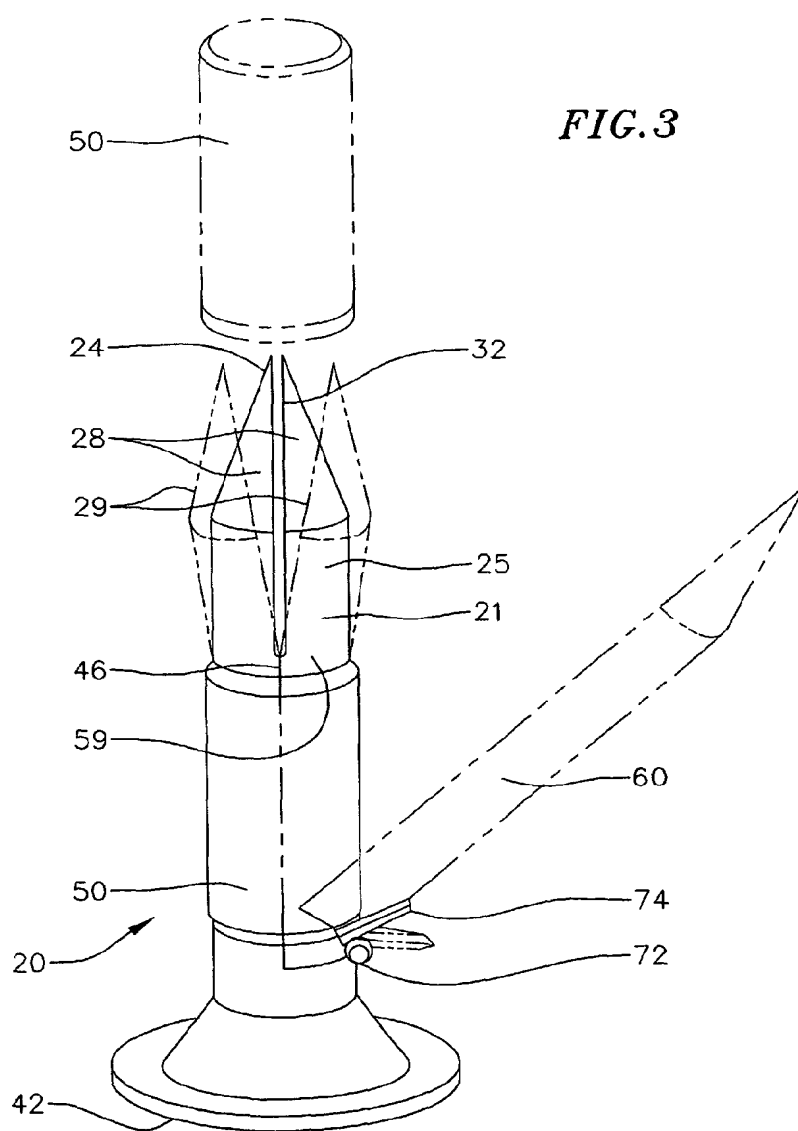
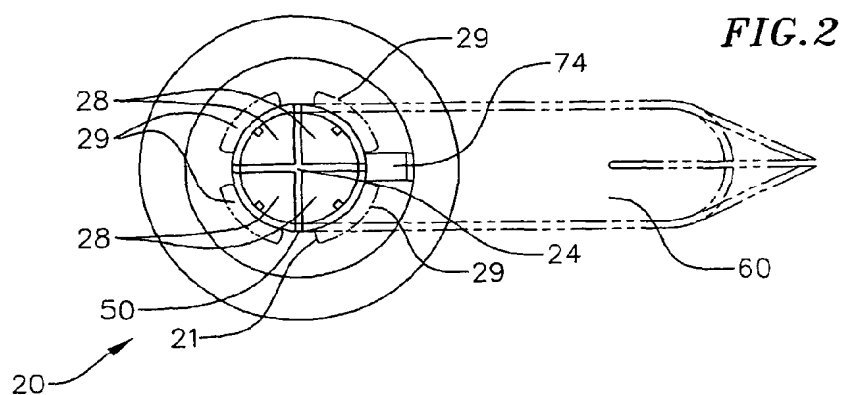
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**FIG. 1**





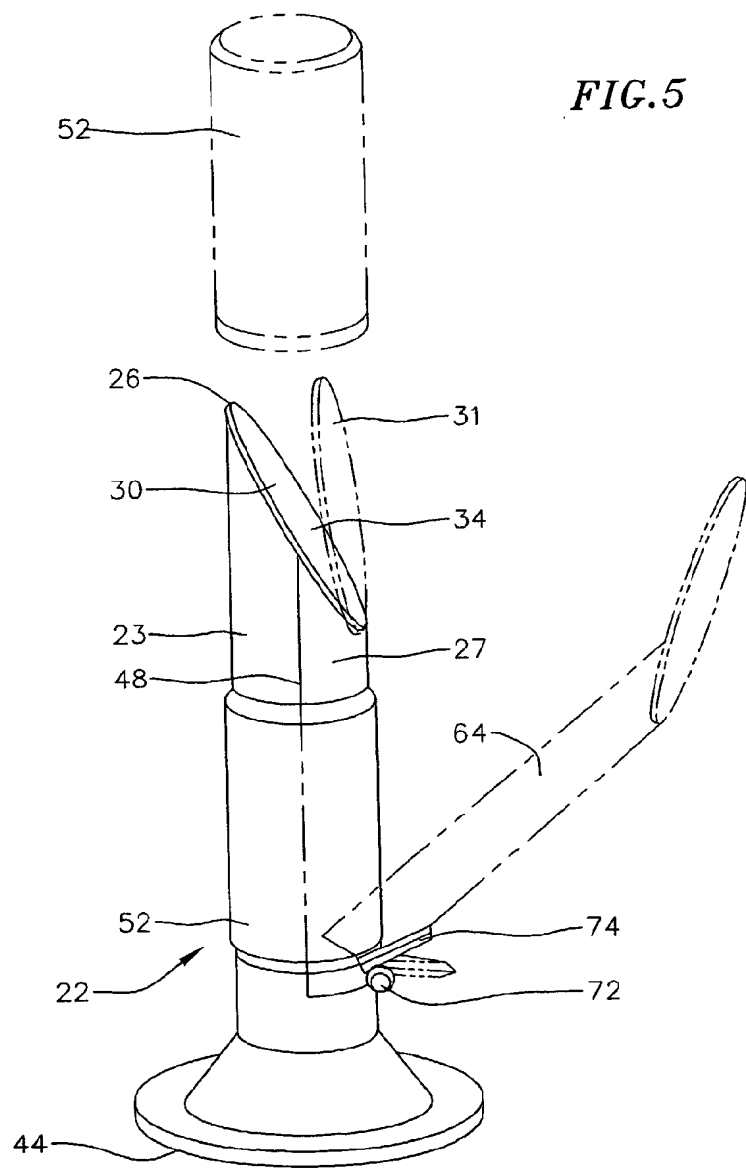
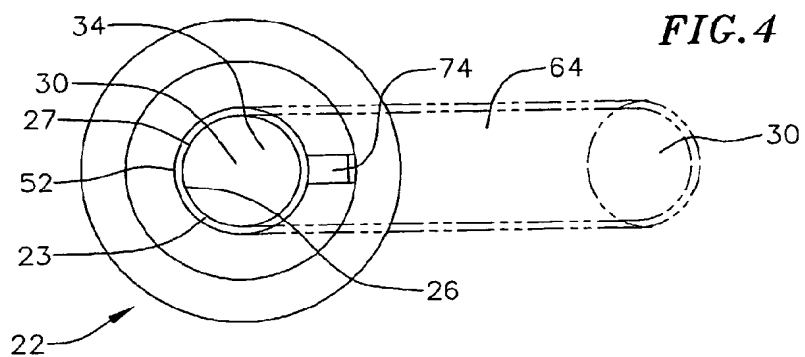
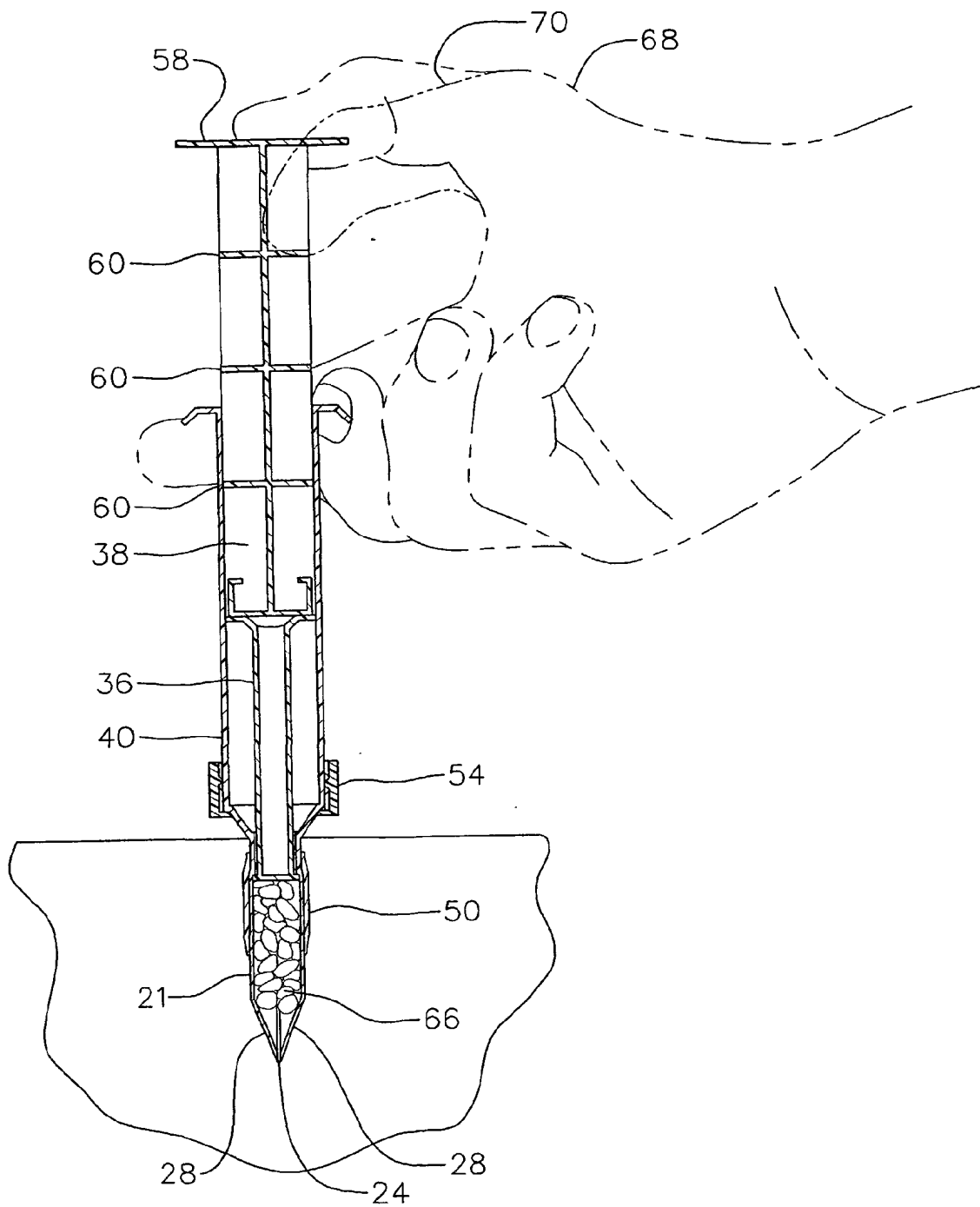
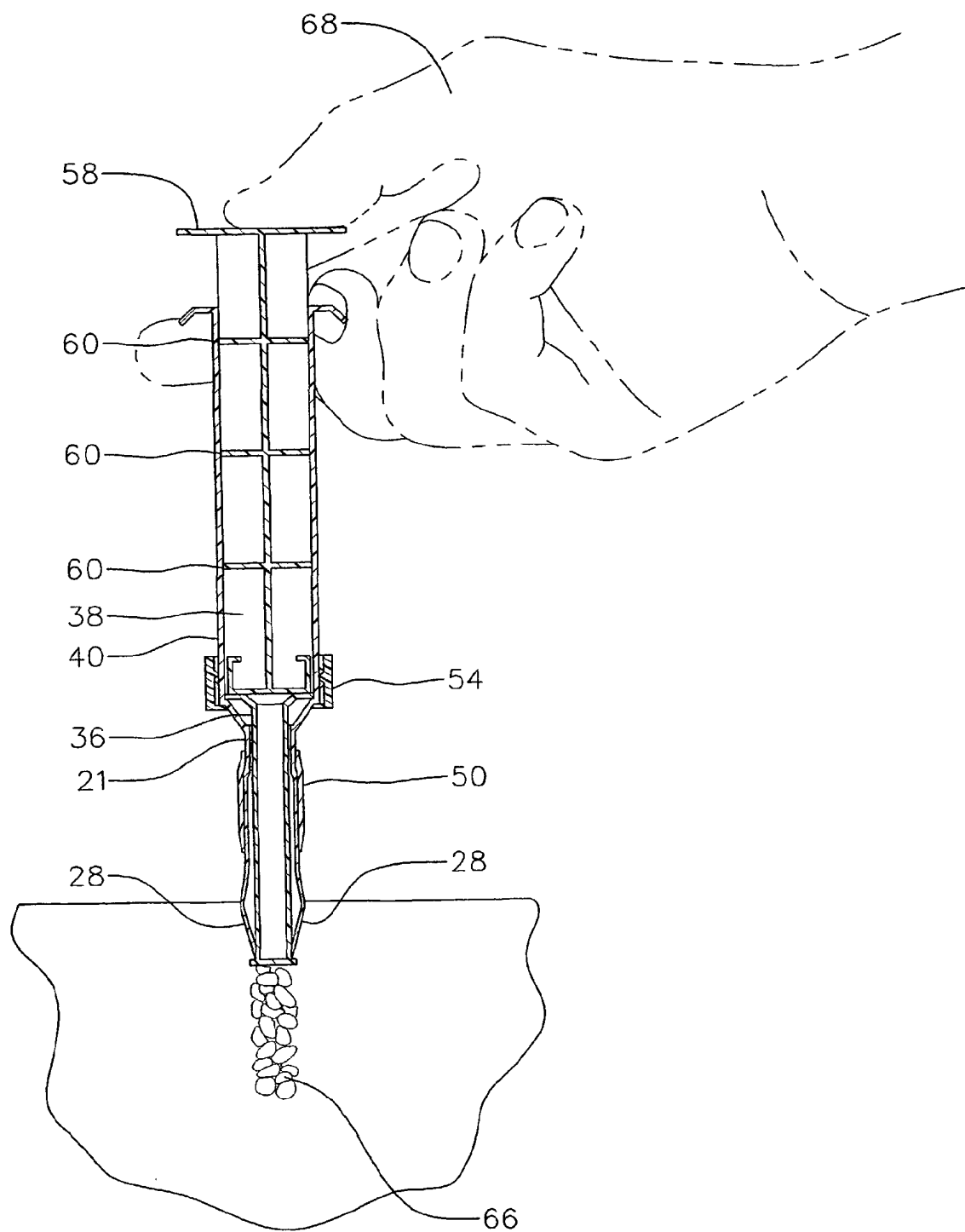


FIG. 6



**FIG. 7**



*FIG. 8*

